WHAT IS CLAIMED IS:

1. A surface reforming method for reforming a partial surface to be reformed composing at least a part of the surface of a prescribed element by supplying a functional group for surface reforming to said partial surface, wherein said surface reforming method comprises:

a first step of supplying a liquid containing a polymer which comprises a first part having a functional group and a second part having an interfacial energy different from that of said functional group and approximately equal to the surface energy of said partial surface and which is different from a constituent material forming said partial surface; and

a second step of orienting the second part of said polymer toward said partial surface and orienting said first part in the different side from said partial surface to supply said functional group to said partial surface.

2. A surface reforming method as set forth in claim 1, further comprising a third step of supplying a catalyst for cleaving a polymer in the liquid containing the polymer in said first step and a fourth step of cleaving said polymer using said catalyst for cleaving a polymer to be fractionalized polymers on

said partial surface.

3. A surface reforming method as set forth in claim 2, further comprising a step of bonding said fractionalized polymers with one another on said partial surface.

4. A surface reforming method for reforming a partial surface to be reformed composing at least a part of the surface of a prescribed element by supplying a functional group for surface reforming to said partial surface, wherein said surface reforming method comprises:

a first step of providing said partial surface with a liquid containing fractionalized products which are obtained by cleaving a polymer comprising a first part having a functional group and a second part having an interfacial energy different from that of said functional group and approximately equal to the surface energy of said partial surface and which comprise said first part and said second part;

a second step of orienting the second part of said fractionalized products to said partial surface and orienting said first part in the different side from said partial surface; and

a third step of at least partially polymerizing the fractionalized products oriented on said partial

surface one another by condensation polymerization.

5. A surface reforming method as set forth in claim 4, wherein said third step comprises a heating step for causing said condensation polymerization.

6. A surface reforming method as set forth in either one of claims 4 and 5, wherein said functional group is a hydrophilic group.

7. A surface reforming method as set forth in claim 4, wherein said partial surface exists in the inner face of an element forming an inner space.

8. A surface reforming method as set forth in claim 4, wherein said element is a string-like element.

9. A surface reforming method as set forth in claim 4, wherein said element is a particle-like element.

10. A surface reforming method as set forth in claim 4, wherein said element has a circular part composed of a curved plane forming an outer circumference of a cross-section with a closed circular shape and has said partial surface in the outer circumferential face of said circular part and is

provided with a part coated with a film containing said polymer and circularly and closely surrounding at least the outer circumference of said circular part in one turn by said second step.

11. A surface reforming method as set forth in claim 4, wherein said functional group-supplying polymer is an organosiloxane having a functional group.

12. A surface reforming method as set forth in claim 4, wherein said partial surface is composed of an olefinic resin and said functional group-supplying polymer is a polyalkylsiloxane having a functional group.

13. A surface reforming method as set forth in claim 11, wherein said functional group of polyalkylsiloxane having a functional group is polyalkylene oxide.

14. A surface reforming method as set forth in claim 13, wherein polyalkylsiloxane having said functional group is (polyoxyalkylene)-poly(dimethylsiloxane).

15. A surface reforming method as set forth in claim 4, further comprising a step of removing

unreacted elements after said second step.

16. An element having a partial surface composing at least a part of the surface and provided with a polymer compound, wherein said polymer compound is a material which is either soluble in a solvent or having a main skeletal structure different from the material at least composing a part of said partial surface and which comprises a first part having a functional group and a second part having the interfacial energy different from that of said functional group and approximately equal to the surface energy of said partial surface, and

said second part is oriented toward said partial surface and said first part is oriented in the direction different from that said partial surface.

17. An element as set forth in claim 16, wherein said element has a circular part composed of a curved plane at least in a part and is provided with said polymer compound in at least a part in said circular part as to coat the part with said polymer compound.

18. An element as set forth in claim 16, wherein said partial surface of said element is composed of an olefinic resin and said polymer compound is a polyalkylsiloxane having a hydrophilic group.

19. An element as set forth in claim 17, wherein said hydrophilic group is polyalkylene oxide.

20. An element as set forth in claim 18, wherein said olefinic resin is polypropylene or polyethylene and said polyalkylsiloxane having said hydrophilic group is (polyoxyalkylene)-poly(dimethylsiloxane).

21. An element as set forth in claim 16, a substance reactive on said functional group is introduced into said partial surface by causing reaction of said functional group with said substance reactive on said functional group.

22. An element as set forth in claim 21, wherein said substance reactive on said functional group is a coloring material.

23. An element provided with a polymer compound in a face composed of a polymer material having 80° or wider contact angle to water,

wherein said polymer compound is a material which is either soluble in a solvent or having a main skeletal structure different from said polymer material and comprises a first part having a hydrophilic group and a second part having the interfacial energy lower than the interfacial energy of said hydrophilic group

and approximately equal to the surface energy of said face composed of said polymer material, and

said second part is oriented toward the face composed of said polymer material and said first part is oriented in the direction different from that of the face composed of said polymer material to give hydrophilicity to the face composed of said polymer material.

24. A fibrous body made of a fiber, having an olefinic resin at least in the surface and provided with a polymer compound in said surface,

wherein said polymer compound is a material which is either soluble in a solvent or having a main skeletal structure different from said material forming the surface and which is a polyalkylsiloxane comprising a hydrophilic group and the alkylsiloxane part of said polyalkylsiloxane is oriented toward said surface and said hydrophilic group is oriented toward the direction different from said surface side to provide said surface with hydrophilicity.

25. A fibrous body as set forth in claim 24, wherein said fiber is composed of a core part and a surface layer coating said core part which are respectively made of olefinic resins and said resin composing said core part has a melting point higher

than that of the resin composing said surface layer.

26. A fibrous body as set forth in claim 25, wherein said core part is partially exposed to the outer wall face and both of the exposed part of said core part and said surface layer are provided with hydrophilicity.

27. A fibrous body as set forth in claim 26, wherein said resin composing said core part is polypropylene and said resin composing said surface layer is polyethylene.

28. A method for manufacturing a fiber with reformed surface, wherein said method is for manufacturing a fiber having an olefinic resin at least in the surface and a reformed surface provided with hydrophilicity in said surface and comprises:

a first step of supplying a solution containing a dissolved alkylsiloxane polymer having a hydrophilic group to said surface; and

a second step of orienting said alkylsiloxane to said surface and orienting said hydrophilic group in the different direction from said surface.

29. A method for manufacturing a fiber with reformed surface, wherein said method is for

manufacturing a fiber having an olefinic resin at least in the surface and a reformed surface provided with hydrophilicity in said surface and comprises:

a first step of supplying, to said surface, a solution containing dissolved fractionalized products obtained by cleaving of an alkylsiloxane polymer having a hydrophilic group; and

a second step of condensing said fractionalized products on said surface and simultaneously orienting said alkylsiloxane to said surface and orienting said hydrophilic group in the different direction from said surface.

30. A method for manufacturing a fiber with reformed surface, wherein said method is for manufacturing a fiber having an olefinic resin at least in the surface and a reformed surface provided with hydrophilicity in said surface and comprises:

a step of forming a fiber surface coated with a treatment solution containing a polyalkylsiloxane having a hydrophilic group, an acid, and an alcohol; and

a step of drying the treatment solution adhering to said fiber surface at a temperature higher than a room temperature.

31. A method for manufacturing a fiber with

reformed surface, wherein said method is for manufacturing a fiber having an olefinic resin at least in the surface and a reformed surface provided with hydrophilicity in said surface and comprises:

a step of forming a fiber surface coated with a treatment solution containing a polyalkylsiloxane having a hydrophilic group, an acid, an alcohol, and water; and

a step of drying the treatment solution adhering to said fiber surface while making said surface hydrophilic by orienting said hydrophilic group in the opposed direction to said surface.

32. A surface reforming method for the surface of a prescribed element, wherein said surface reforming method comprises:

a first step of supplying, to said surface, a liquid containing a diluted sulfuric acid, a volatile agent for reforming the affinity with the element surface and a treatment agent of a polymer comprising a first part having a group with an interfacial energy approximately equal to the surface energy of said surface and a second part having a group with an interfacial energy different from said interfacial energy;

a second step of removing said agent for reforming the affinity by heating said surface;

a third step of cleaving the polymer in said treatment agent by concentrating said diluted sulfuric acid to a concentrated sulfuric acid; and

a fourth step of condensation-polymerizing said ring-opened polymer on said surface and at the same time orienting the first part of the polymer toward said surface and orienting the second part in the different side from said surface.

33. A surface reforming method for reforming the surface of an element by introducing a functional group into said surface, wherein said surface reforming method comprises a step of condensation-polymerizing fractionalized products comprising a first part having a group with an interfacial energy approximately equal to the surface energy of said surface and a second part having the functional group and obtained by cleaving a polymer compound having said first part and said second part in the condition wherein the fractionalized products are oriented based on the affinity of the group having the interfacial energy approximately equal to the surface energy with said surface.

34. An element having a reformed surface into which a functional group,

wherein said element bears a condensate substance of fractionalized products in said surface, wherein

said fractionalized products comprise a first part having a group with an interfacial energy approximately equal to the surface energy of said surface and a second part having said functional group, are obtained by cleaving a polymer compound having said first part and said second part, and are condensed in the condition that the fractionalized products are oriented based on the affinity of the group having the interfacial energy approximately equal to the surface energy with said surface.

35. An element having a reformed surface, wherein said element has at least a circular part which is composed of a curved face forming a closed circular shape as an outer circumferential cross-section and which has at least a part coated with a film containing a polymer and circularly surrounded with the film in one closed turn as to reform said surface part,

wherein said polymer compound is a material which is soluble in a solvent or has a main skeletal structure different from the material of said element surface and which comprises a first part having a functional group for reforming said surface and a second part having the interfacial energy different from that of said functional group and approximately equal to the surface energy of said surface, and

said second part is oriented toward said surface

and said first part is oriented in the direction different from that of said surface.

36. A surface reforming method for reforming the hydrophobic surface of an element to be hydrophilic, wherein said surface reforming method comprises a step of sticking, to said hydrophobic surface, fractionalized products comprising a hydrophilic group and a hydrophobic group and obtained by cleaving a polymer compound having said hydrophilic group and said hydrophobic group in a manner that said hydrophobic group is oriented in the surface side of said hydrophobic surface and said hydrophilic group is oriented in the direction different from that of the hydrophobic group.

37. A surface reforming method as set forth in claim 35, wherein said fractionalized products on said hydrophobic surface are condensation-polymerized with one another.

38. A surface reforming method as set forth in claim 35 or 36, wherein said step comprises a step of fractionalizing said polymer compound by applying a liquid containing said polymer compound and a diluted sulfuric acid to said hydrophobic surface, concentrating said diluted sulfuric acid to be a

concentrated sulfuric acid on said hydrophobic surface, and cleaving said polymer compound by said concentrated sulfuric acid.

39. A surface reforming method as set forth in claim 36, wherein said step is carried out by using a liquid containing water and a non-aqueous solvent with lower vapor pressure than that of water as said liquid and in a drying step of said liquid on said hydrophobic surface, said non-aqueous solvent is evaporated prior to water to element a state in which a thin film of water is formed on said hydrophobic surface.

40. A surface reforming method as set forth in claims 36, wherein said liquid has a composition having wettability to a desired face of said hydrophobic surface.

41. A surface reforming method as set forth in claim 36, wherein said polymer compound is an organosiloxane having a hydrophilic group.

42. A surface reforming method as set forth in claim 36, wherein the hydrophobic surface of said element is composed of an olefinic resin.

43. A surface reforming method as set forth in

claim 36, wherein said polymer compound is polyalkylsiloxane having a hydrophilic group.

44. A surface reforming method as set forth in claim 43, wherein said hydrophilic group has poly(alkylene oxide) chains.

45. A surface reforming method as set forth in claim 43, wherein said polyalkylsiloxane having said hydrophilic group is (polyoxyalkylene)-poly(dimethylsiloxane).

46. A surface reforming method as set forth in claim 36, wherein said element has a practically closed space and a hydrophobic surface to be surface reformed exists in said closed space.

47. A surface reforming method as set forth in claim 36, wherein said element is granular.

48. A surface reforming method as set forth in claim 36, wherein said element has at least a circular part which is composed of a curved face forming a closed circular shape as an outer circumferential cross-section and said step comprises a step of coating at least a part of outer circumference of said circular part of said element with said fractionalized products.

49. An element having a reformed surface, wherein said element has a hydrophobic surface to be reformed to be hydrophilic and said hydrophobic surface is reformed to be hydrophilic by being stuck with fractionalized products comprising a hydrophilic group and a hydrophobic group and obtained by cleaving a polymer compound having said hydrophilic group and said hydrophobic group in a manner that said hydrophobic group is oriented in the surface side of said hydrophobic surface and said hydrophilic group is oriented in the direction different from that of the hydrophobic group.

50. An element as set forth in claim 49 having a granular shape.

51. An element as set forth in claim 49, wherein said element has at least a circular part which is composed of a curved face forming a closed circular shape as an outer circumferential cross-section and said fractionalized products are stuck to at least a part of the outer circumference of said circular part.

52. An element as set forth in claim 47, wherein said element has a practically closed space and said hydrophobic surface facing to said closed space.

53. An element as set forth in claim 49, wherein said hydrophobic surface is composed of an olefinic resin.

54. An element as set forth in claim 51, wherein said olefinic resin is polypropylene or polyethylene.

55. An element as set forth in claim 49, wherein said element is a fiber and said hydrophobic surface is the surface of said fiber.

56. An element as set forth in claim 55, wherein said fiber is composed of a core part and a surface layer coating said core part which are respectively made of olefinic resins and said resin composing said core part has a melting point higher than that of the resin composing said surface layer.

57. An element as set forth in claim 56, wherein a resin composing said core part is polypropylene and a resin composing said surface layer is polyethylene.

58. An element as set forth in claim 57, wherein said core part is partially exposed to the outer wall face and said fractionalized products adhere to both of the exposed part of said core part and said surface layer.

59. An element as set forth in any one of claims 49 to 58, wherein said polymer compound having a hydrophilic group is polyalkylsiloxane.

60. An element as set forth in claim 59, wherein said element comprises a poly(alkylene oxide) group as said hydrophilic group.

61. An element as set forth in any one of claims 49 to 58, wherein said polyalkylsiloxane having said hydrophilic group is (polyoxyalkylene)-poly(dimethylsiloxane).

62. A surface treatment solution to be used for the surface reforming method for carrying out surface reforming by supplying a functional group for reforming to a partial surface to be reformed composing at least a part of the surface of a prescribed element,

wherein said solution contains a polymer provided with a first part having a functional group and a second part having the interfacial energy different from that of said functional group and approximately equal to the surface energy of said partial surface, a volatile solvent having sufficient wettability to said element and being a good solvent to the polymer, and a cleaving catalyst of said polymer.

63. A surface treatment solution as set forth in claim 62, wherein said surface treatment solution further contains a second solvent having wettability sufficient to said element but lower than that of said volatile solvent, which is a good solvent to a polymer and has sufficient wettability to said element, being a good solvent to a polymer, and having volatility lower than that of said volatile solvent, which is a good solvent to a polymer.

64. A method for producing a surface treatment solution as set forth in claim 63, wherein said method for producing said surface treatment solution is carried out by dissolving said polymer in a volatile solvent having sufficient wettability to said element and being a good solvent to said polymer and then mixing a volatile solvent having no wettability to said element and being a good solvent to said polymer.

65. A surface reforming method for carrying out surface reforming for a partial surface of an element,

wherein said surface reforming method reforms the surface by carrying out, on said partial surface, condensation polymerization of ring-opened polymers oriented based on the affinity of the interfacial energy of a group similar to the surface energy of the partial surface of said element.

66. A liquid-contacting surface structure of an element, wherein said liquid-contacting surface structure is of an element provided with a liquid and maintaining said liquid and is provided with a polymer having practically reciprocally a hydrophilic group with a relatively long chain and a hydrophobic group with a relatively short chain.

67. A liquid-contacting surface structure as set forth in claim 66, wherein in the case where said liquid is an aqueous liquid, said hydrophilic group is a side chain group of a polymer structure having a hydrophilic group and said hydrophobic group is a side chain group having methyl group.

68. An element reforming method for reforming at least a partial surface of an element using a liquid-phase polymer,

wherein said reforming method comprises a condensation polymerization step of condensation polymerizing, on said element surface, fractionalized products after cleaving of a polymer which is ring-openable and condensation-polymerizable and comprises a first group having a functional group and a second group having an interfacial energy approximately equal to the surface energy of the partial surface of the element.

69. An element reforming method as set forth in claim 68, wherein said condensation polymerization step comprises an annealing step of water molecule generated at the time of condensation polymerization on completion of evaporation of a solution dissolving said polymer.

70. An element reforming method as set forth in claim 69, wherein the heating temperature in said annealing step is higher than the highest temperature at the time of using said element and lower than the melting point of said element and the melting point of said polymer.

71. An element having an olefinic resin at least in the surface and a reformed surface by making said surface be hydrophilic, wherein said element has a liquid-contacting surface structure having practically reciprocally a hydrophilic group with a relatively long chain and a hydrophobic group with a relatively short chain on said element surface and formed by forming an element surface coated with a treatment solution containing a polymer having the hydrophilic group and a group with an interfacial energy approximately equal to the surface energy of the element surface comprising at least said olefinic resin as a constituent component, a diluted sulfuric acid as a cleaving catalyst of said

polymer, and an alcohol, evaporating the treatment solution adhering to said element surface and simultaneously concentrating the diluted sulfuric acid to be a concentrated sulfuric acid on said element surface to ring-open said polymer, and then condensation-polymerizing the ring-opened products.